



Aalborg Universitet

AALBORG UNIVERSITY
DENMARK

Enhanced bonding between TiO₂-Graphene oxide

Naknikham, Usuma; Buffa, Vittorio; Yue, Yuanzheng

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):
Naknikham, U., Buffa, V., & Yue, Y. (2017). *Enhanced bonding between TiO₂-Graphene oxide*. Abstract from Graphene Week 2017, Athens , Greece.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Enhanced bonding between TiO₂-Graphene oxide

Usuma Naknikham^{1*}, Vittorio Buffa¹, Yuanzheng Yue¹,

¹*Department of Chemistry and Bioscience, Aalborg University, 9220 Aalborg, Denmark.*

**E-mail: un@bio.aau.dk*

Since an increasing number of emerging pollutants has been found in wastewater and natural water systems [1], many researchers are developing new synergy-effective methods for their abatement [2]. In this context, we fabricate titanium dioxide-graphene oxide (TiO₂-GO) heterostructures as photocatalysts, which can efficiently react with organic species under solar light and can enhance the adsorption of water pollutants [3]. Many studies have shown that TiO₂-GO heterostructures can quickly mineralize organic dyes in solution under UV-light. However, it is not clear if these materials can provide the same performances under sunlight and with complex real water systems. Hence, this research aims to study the photocatalytic property on GO-TiO₂ composites with aqueous solutions of selected emerging pollutants under visible light. The samples were synthesized via the *in-situ* sol-gel nucleation and growth of TiO₂ nanoparticles on GO sheets at 1wt% of GO and pH 6 for 4 hours under thermal [4] or hydrothermal synthesis. The structure and the properties of the new materials were studied by varying the synthesis conditions. The morphology of such composites was characterized by XRD, SEM and TEM analysis. Besides, the study of Ti-O-C and Ti-C interface bonding was carried out using XPS. The band-gap energy was determined using a UV-VIS spectrophotometer equipped with an integrating sphere. Thus, it was possible for us to determine the reactivity of the new photocatalysts under the visible light. Finally, the photocatalytic performances of the GO-TiO₂ heterostructures were examined on the model pollutants in a solar simulator.

References:

- [1] Bruce et al, Water Research, 72, 3-27, (2015)
- [2] Vittorio et al, Carbon, 118, 458-466, (2017)
- [3] Li et al., Applied Catalysis B: Environmental, 201, 470-478, (2017)
- [4] U. et al., to be submitted